Construction Performance and Organisational Culture

Vaughan Coffey
Queensland University of Technology, Brisbane, Australia
(email: v.coffey@qut.edu.au)
Debby Willar
Queensland University of Technology, Brisbane, Australia
(email: debby.willar@student.qut.edu.au)

Abstract

The purpose of this paper is to summarize the outcomes of a detailed research study carried out as part of the fulfilment of a doctoral programme which examined the relationships between, and impacts of organisational culture on construction performance within a Hong Kong context. The research used a mixed methodology approach consisting of an organisational culture survey using an adapted validated and reliable measurement instrument (the Denison Organisational Culture Survey), mini-case studies in four Hong Kong construction companies and correlated the derived culture scores against performance scores measured by the Hong Kong Housing Department Performance Assessment Scoring System (PASS). The significance of the research was to advance knowledge of the importance of organisational culture strength as a performance driver in the construction industry and the further proof of the culture performance links using a set of measures of the latter which were not financially-based. The findings of the research make a contribution to theory by further validating the work by Denison (1990) and others, not only in that a successful link between organisational culture and performance was demonstrated, but it also identifies particular cultural factors in organisations that appear to be significantly responsible for achieving successful outcomes and reveals opportunities for further research into the organisational culture of construction companies

Keywords: organisational culture, construction performance, business success.

1. Introduction

Public housing in Hong Kong has a fairly modern history, which began in 1953 with a fire at Shek Kip Mei that destroyed a large area of squatter huts housing predominantly families of refugees from China (Leung 1999, 23). This fire left over 60,000 people homeless overnight and the story of how this tragedy was one of the triggers that over the next 55 years has lead to the roll-out of one of the largest and most successful public housing programmes in the world is well documented (Drakakis-Smith 1979; Bristow 1984; Leung 1999). Whilst the government was very successful over the next three decades in developing, building and letting a building stock that housed nearly 50% of the extant population on Hong Kong Island and in the New Territories, an increasing spate of serious maintenance issues began to appear in the early 1980s, resulting in the condemning, major repair or demolition of some 26 multi-storey housing blocks. Once this disastrous situation became public knowledge, all government departments and especially the Hong Kong Housing Authority (HKHA) and its executive arm, the HKHD, were forced to reconsider their construction quality control systems to assure a distraught public that this could never happen again.

In 1989, HKHD developed its own list of contractors specializing in residential high-rise building and at the same time developed a robust objective performance monitoring system of construction quality, known as PASS. A committee of senior departmental professionals, on a quarterly basis considers project performance drawn from PASS and recommends tendering opportunities and penalty actions for approval by a higher level HKHA committee.

The connection between strong organisational culture and corporate effectiveness is examined in this paper. Significant in the relationship is the measurement of construction quality.

2. Performance Assessment

The research described here used data generated by the Hong Kong Housing Department (HKHD) Performance Assessment Scoring System (PASS) from 2000 to 2001. A simplified model of the constituent measures used in PASS 1997 Version to generate an effectiveness (i.e. performance) score is shown in Figure 1.

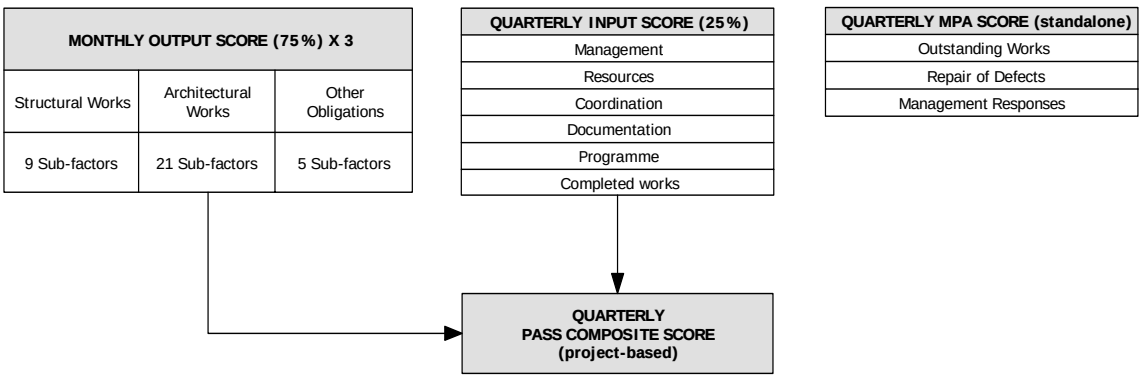

Figure 1: Simplified model of PASS 1997 Version

Every 3 months, the Quarterly PASS Composite Scores (QPCS) of all projects being undertaken by individual contractors are then amalgamated to form a Quarterly Contractor Score for each active company, an important component of the PASS Contractors' Score-league measuring the comparative achievement of building contractors across all of their public housing contract works, as follows:

a) Quarterly Project Score League – shown in Table 1 below, reflects contractors' performance on individual projects. The league is categorized into three bands with two benchmark lines:

- Composite Target Quality Score (CTQS) is drawn at the upper quartile (25 percentile) of the league.

- Composite Lower Score Threshold (CLST) is drawn at the lower quartile (75 percentile).

Table 1 : Sample of the Quarterly Project Score League

Project	***Contractor***	***QPCS***	
Project 1	*Contractor A*	*93.05*	
Project 2	*Contractor A*	*92.90*	
:	*:*	*:*	
Project 9	*Contractor B*	*91.25*	
Project 10	*Contractor B*	***91.00***	***Composite Target Quality Score (CTQS)***
Project 11	*Contractor B*	*90.89*	
Project 12	*Contractor C*	*89.20*	
Project 13	*Contractor C*	*89.14*	
:	*:*	*:*	
Project 27	*Contractor D*	*87.01*	
Project 28	*Contractor E*	*86.86*	
Project 29	*Contractor E*	*85.60*	
Project 30	*Contractor F*	***84.18***	***Composite Lower Score Threshold (CLST)***
Project 31	*Contractor F*	*84.00*	
Project 32	*Contractor A*	*83.27*	
:	*:*	*:*	
Project 40	*Contractor C*	*81.50*	

(NOTE: Score league simulated for illustration purposes only – some scores omitted)

b) Quarterly Contractors' Score League – shown in Table 2 below, considers overall performance of contractors across all projects being undertaken (i.e. a contractor's composite score would be the average of all its individual project scores).

The CTQS and CLST lines, drawn from the Quarterly Project Score League, are superimposed onto the Quarterly Contractors' Score League. Contractors who fall in the upper band of this league (i.e. above CTQS) will normally be invited to tender for all upcoming contracts in the next quarter, whereas contractors in the lower band, i.e. below CLST, will not be invited to tender for any projects during the next quarter. Those contractors falling between CTQS and CLST will be given varying tendering opportunities, as decided by the HKHD.

Table 2: Sample of the Quarterly Contractors' Score League

Contractor	***Composite Score***	***Eligibility to Tender # nos. of Projects***	***Based on 6 Projects to tender in the Quarter under Consideration***
Contractor A	*92.98*	*6*	
Contractor B	*91.03*		
91.00 Composite Target Quality Score (CTQS)			
Contractor C	*90.01*	*4*	
Contractor D	*87.11*		
Contractor E	*86.55*		
Contractor F	*86.01*		
Contractor G	*85.89*	*2*	
Contractor H	*85.77*		
Contractor I	*85.01*		
Contractor J	*84.69*		
84.18 Composite Lower Score Threshold (CLST)			
Contractor K	*84.12*	*NIL*	
Contractor L	*84.01*		

(NOTE: Score league simulated for illustration purposes only – some scores omitted)

2.1 Impact of PASS on performance of contractors

Figure 2 below clearly demonstrates the overall performance improvement of contractors on projects during the first four years of introducing PASS 1997. These actions ranged from a 3-month restriction from tendering through to longer periods of formal suspension, and in extreme cases, removal from the list. With the exception of the removal in 1993 of 63 companies, due to their not attaining the required ISO 9000 Standard certification by the official deadline date set by HKHD, the actual number of removals from the HA list and suspensions for disciplinary reasons of companies on the list has been quite small. However, the numbers of contractors restricted from tendering for a prescribed 3-month interval due to poor PASS results since 1997 has been much more significant.

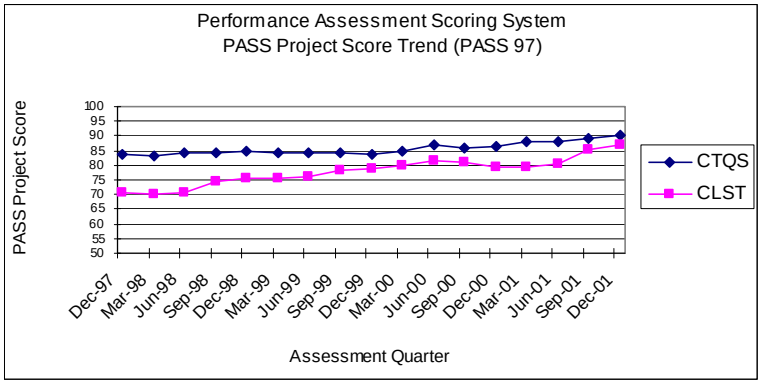

Figure 2: PASS Score Trend 1997- 2001

To ensure the continued effective operation of PASS, the HKHD has needed to constantly monitor, review and enhance the system. These reviews identify the main areas of performance shortcomings

revealed on projects and raised by assessors, contractors and client. PASS assessments are now carried out by dedicated independent teams and project teams also contribute by way of daily site inspection records and Management Input scores on a quarterly basis. Figure 3 below shows how the newest major version of the system (i.e., PASS 2000) has continued to improve performance in the years following 2001:

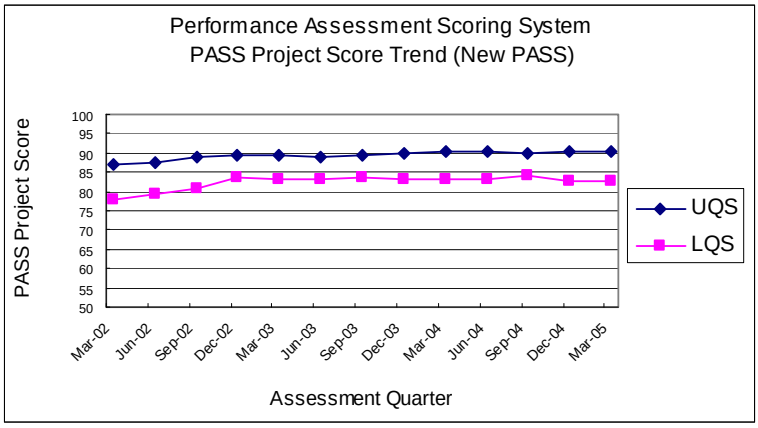

Figure 3: PASS Score trends 2001 – 2005

Given such a robust system, it was logical to use the measured performance outcomes as a basis for determining the varying organisational and business success of HKHA listed companies within the research that informs this paper. Much of the previous research on organisational effectiveness undertaken since the early 1970s relied on the use of financial measures to determine performance levels, typically individual accounting indices such as return on investment (ROI), return on assets (ROA) and return on equity (ROE) have been used (Grinyer and Norburn 1975; Karger and Malik 1975). Longitudinally measured multiple financial accounting indices were used in some later studies (Hitt, Ireland, and Stadter 1982) and the capital asset pricing model performance indicators evolved by Lubatkin (1983) were also used as a basis for research by Hitt and Ireland (1985).

Despite the popularity of such models and indicators, their use to represent organisational effectiveness has been criticized over the last twenty years. Hitt (1988, 30) notes that they "have deficiencies as 'true' indicators" and their use "does not capture the essence of organisational effectiveness." As had been the case with the lack of consensus amongst both researchers and managers on defining organisational effectiveness, a similar dilemma existed in relation to agreement on the most effective measurements of the phenomena (Bourgeois 1980; Tsui 1990). Some researchers questioned whether in view of the lack of agreement on such fundamental questions as definitions and measures, organisational effectiveness should even be researched (Hannan and Freeman 1977; Bluedorn 1980).

3. Measuring Organisational Culture

Following a detailed investigation of the wide range of definitions of 'organisational culture' that exist in the extant literature, a fairly concise operational definition of culture taken from Bates and Plog (1990) was used for this study "Culture is the system of shared beliefs, values, customs,

behaviours, and artefacts that the members of society use to cope with their world and with one another, and that are transmitted from generation to generation through learning."

Several methodologies and instruments used previously for measuring organisational culture were examined and the Denison Organisational Culture Survey (DOCS) was eventually selected as being the most suitable to use in the context of this research due to its suitability for use in, and wide acceptability by, the business environment. Based on 15 years of research drawn from data obtained from over 1,000 high and low-performing organisations, Denison and Mishra (1996) developed the Denison Organisational Culture model and Table 3 below shows the major aspects of this model.

Table 3 : Aspects and indices of the Denison Organisational Culture Model

Cultural Traits	***Cultural Indices***
ADAPTABILITY	*Creating change*
	Customer focus
	Organisational learning
MISSION	*Strategic direction and intent*
	Goals and objectives
	Vision
CONSISTENCY	*Coordination and integration*
	Agreement
	Core values
INVOLVEMENT	*Capability development*
	Team orientation
	Empowerment

4. Research Study

Several researchers and authors have presumed a link between organisational culture and corporate performance and some of these research studies have established evidence of such a link and thus concluded that it does indeed exist Denison (1990), Kotter and Heskett (1992), Petty et al. (1995) and Wilderom and van den Berg (2000). However, other critical reviews of the methodologies and findings used in such research challenge such conclusions (Lim 1995). The author's research presented in this paper examines the linkage between organisational culture and the performance of Hong Kong construction companies.

The three research questions developed by the researcher (Coffey 2005) were:

<u>*Question 1*</u>: Do Hong Kong construction companies possessing relatively high combined levels of the four organisational cultural 'traits' i.e. adaptability, involvement, consistency and mission (as indicated by the Denison Organisational Culture Model) perform more successfully on public housing projects than those exhibiting lower levels of those traits?

<u>*Question 2*</u>: Are any of the four traits more significant in contributing to success levels than others?

Question 3: Are any combinations of the four traits, based on a horizontal or vertical split of the Denison Organisational Culture Model, more significant in contributing to success levels than others?

The DOCS was distributed to all 53 building contractors on the HKHA's list in the Building (New Works) Category and the total number of returned survey sets was 29 (54.7%) and of these some 23 sets were eventually useable in the study data set (43.40%), based on post-return established cut-off criteria. As each company provided several returns drawn from different levels of management and control within the company, there were some 159 useable returns overall.

4.1 Detailed results

Question 1 explores the overall theoretical concept of a presumed link between organisational culture (OC) and organisational performance (OP) and so correlation was investigated between the *overall* organisational culture raw scores of contractors and their PASS-measured performance.

Table 4 : Pearson correlation results - overall OC and overall performance scores

Correlations

		Overall Cultural Score	Overall PASS Score (00-01)
Overall Cultural Score	Pearson Correlation	1.000	.532*
	Sig. (2-tailed)	.	.019
	N	23	19
Overall PASS Score (00-01)	Pearson Correlation	.532*	1.000
	Sig. (2-tailed)	.019	.
	N	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen in Table 4 above, the results show that in companies possessing high combined DOCS scores, their 'strong' organisational culture is positively and significantly associated with high levels of organisational performance measured by PASS. Question 2 explored the concept developed by Denison and Neale (1994) that the four cultural traits of 'Mission', 'Consistency', 'Involvement' and 'Adaptability' have a strong influence on organisational performance. The four cultural trait scores obtained from the DOCS and success levels of the respondent contractors measured as their overall PASS scores was tested and the results are shown in Table 5 below:

Table 5 : Pearson correlation results - four OC traits and overall performance scores

Correlations

		Overall PASS Score (00-01)	Involvement	Consistency	Adaptability	Mission
Overall PASS Score (00-01)	Pearson Correlation	1.000	.367	.522*	.543*	.526*
	Sig. (2-tailed)	.	.123	.022	.016	.021
	N	19	19	19	19	19
Involvement	Pearson Correlation	.367	1.000	.796**	.795**	.756**
	Sig. (2-tailed)	.123	.	.000	.000	.000
	N	19	23	23	23	23
Consistency	Pearson Correlation	.522*	.796**	1.000	.737**	.798**
	Sig. (2-tailed)	.022	.000	.	.000	.000
	N	19	23	23	23	23
Adaptability	Pearson Correlation	.543*	.795**	.737**	1.000	.820**
	Sig. (2-tailed)	.016	.000	.000	.	.000
	N	19	23	23	23	23
Mission	Pearson Correlation	.526*	.756**	.798**	.820**	1.000
	Sig. (2-tailed)	.021	.000	.000	.000	.
	N	19	23	23	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

scores

The Pearson correlation analysis shows a positive relationship between each of 3 cultural traits of 'Consistency', 'Adaptability' and 'Mission' with the overall PASS score at the 5% significance level. Out of these three trait measures of organisational culture strength, 'Adaptability' has the strongest correlation; 'Consistency' has the least correlation, whilst 'Mission' is of moderate significance. Only the correlation between 'Involvement' and overall PASS score cannot be justified in this research study. This high significance of the relationship between 'adaptability' and performance strongly underpins the fact that in a sector such as the construction industry, where the business environment is so volatile and subject to massive and often swift changes, the companies most able to survive are those that are most capable of adapting to these changes. The significant relationship between the traits of 'consistency' and 'mission' and performance highlights the necessity for successful companies to possess core values that are understood by all players and well integrated throughout the organisation through commonly shared goals and objectives and a strong agreed strategic direction. These traits are strongly related to the stability of companies, that creates well-being, loyalty and satisfaction amongst staff. This stability must importantly be reflected in a long-term mission focus which although it may have to adapt, should not significantly change over short spans of time. The low significance of the relationship between 'involvement' and performance is an interesting and somewhat surprising result as according to Denison (2000), organisational cultures characterized as "highly involved" strongly encourage employee involvement and create a sense of ownership and responsibility. Their internal management systems are based on informal, voluntary and implied control rather than on formal, explicit or bureaucratic control and strong commitment to an organisation develops from a sense of personal ownership and an increasing capacity for autonomy.

Question 3 explores the generic theoretical concept proposed by Denison and others (Denison, Cho and Young 2000; Denison, Hoojiberg, and Quinn 1995; Denison and Mishra 1996) that there are a set of tensions and contradictions existing within organisation, which depending on if they are well or badly managed, also have a significant effect on organisational performance. Measurement of the four combinations was obtained by taking average of the corresponding constituent cultural scores. The correlation was then investigated between them and company success represented by overall PASS score. The results of the correlation test are summarised in Table 6 below.

Table 6 : Pearson correlation results - four combined OC traits and overall performance scores

Correlations

		Overall PASS Score (00-01)	External Focus Culture	Internal Focus Culture	Flexible Culture	Stable Culture
Overall PASS Score (00-01)	Pearson Correlation	1.000	.552*	.463*	.486*	.543*
	Sig. (2-tailed)	.	.014	.046	.035	.016
	N	19	19	19	19	19
External Focus Culture	Pearson Correlation	.552*	1.000	.853**	.927**	.952**
	Sig. (2-tailed)	.014	.	.000	.000	.000
	N	19	23	23	23	23
Internal Focus Culture	Pearson Correlation	.463*	.853**	1.000	.925**	.911**
	Sig. (2-tailed)	.046	.000	.	.000	.000
	N	19	23	23	23	23
Flexible Culture	Pearson Correlation	.486*	.927**	.925**	1.000	.866**
	Sig. (2-tailed)	.035	.000	.000	.	.000
	N	19	23	23	23	23
Stable Culture	Pearson Correlation	.543*	.952**	.911**	.866**	1.000
	Sig. (2-tailed)	.016	.000	.000	.000	.
	N	19	23	23	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

From these results, it can be seen that all four combinations of the cultural traits correlate positively with the overall PASS score at 0.05 significance level, but comparatively, 'external focus' and 'stable

culture' correlate more significantly than do 'flexible' company structures' and 'internally focused' companies. The purpose of examining these combined cultural trait combinations and their relationship with performance levels was to ascertain whether companies that could manage these apparently contradictory competing dimensions of the Denison Organisational Culture model performed better than those companies that did not handle them well. Denison (2000, 357) states that "Effective organisations find a way to resolve these dynamic contradictions without relying on a simple trade-off." The trade-offs are:

- stability versus flexibility;
- internal versus external focus;
- internal consistency versus external adaptation; and
- top-down mission versus bottom-up involvement.

In summary, the main findings from the research are:

(1) A high level of company effectiveness is positively associated with strong organisational culture;

(2) A high level of company effectiveness is positively associated with the cultural traits of 'consistency', 'adaptability' and 'mission' but not with "involvement" trait; and,

(3) A high level of company effectiveness is positively associated with the combined cultural traits represented by the dimensions of 'external focus" and "stable culture'.

5. Discussion

Further research is needed to obtain a more detailed and deeper understanding of the organisational culture of the construction industry where study has so far been somewhat limited and longitudinal use of the DOCS and PASS in the research population established for this research would develop and hopefully strengthen the findings described in this paper.

a) The organisational culture and performance link

The qualitative investigation carried out for the study described in this paper clearly indicated a rich source of alternative data to better inform the purely quantitative results of using an instrument to measure organisational culture and this accords with the view of the said instruments author who stated (Denison 2000, 367) "Perceptive insiders and outsiders need to be involved in order to help translate the findings from a model-based analysis of the culture…depth of analysis is needed to support the insights from the survey data and bring them to life." There is a need for more qualitative work to be linked with quantitative studies to increase our knowledge of organisational structure, culture and its affect on performance and although current studies are beginning to move us more swiftly in this direction, further work is required to strengthen this whole field of study.

b) The metrics of organisational performance

This research has clearly demonstrated the benefits of considering alternative ways to operationalize organisational performance other than by the use of purely financial measures. Kennerley and Neely (2002) have summarized the main components of an effective performance measurement system as follows:

- Must provide a "balance" picture of the business,
- Needs to present a succinct overview of the organisation's performance;
- Should be multi-dimensional;
- Requires comprehensiveness;
- Must be integrated both across the organisation's functions and through its hierarchy; and,
- Business results need to be seen as function of the measured determinates.

c) The Hong Kong Construction Industry

Researching the culture of the 23 companies involved in constructing public sector housing in Hong Kong has been a first step only into an area where more research is clearly needed (Chinowsky and Meredith 2000; Fellows and Seymour 2002), however the results of this research need to be extended both laterally (i.e., launched into construction companies outside public sector housing) and longitudinally (i.e., how have the organisational cultures of companies surveyed using DOCS changed since the time of the original study and what affect have changes had on organisational performance as a result?). Through the efforts of the CIB Task Group TG23 (which has later become CIB Working Group W112), research into organisational and corporate culture in the construction industry is now progressing ahead and this will be at a global as well national level of consideration.

6. Conclusions

The outcome of the research was that a link does indeed exist between organisational culture and performance, and that also there is a significant correlation between the strength of an organisation's culture and its comparative effectiveness in performance terms when investigated in the specific setting of Hong Kong. The finding makes a contribution to theory by further validating the work by Denison (1990) and others, not only in that it successfully demonstrates a link between organisational culture and performance, but it also contributes to management and public policy by identifying particular cultural factors in organisations that appear to be significantly responsible for achieving successful outcomes and reveals opportunities for further research into the organisational culture of construction companies.

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